In re Application of: Berthet et al.
Application No. 10/075,721
Response to Final Office Action of July 25, 2006

REMARKS

. The following remarks are responsive to the Office Action of July 25, 2006, which was made Final.

At the time of the Office Action, claims 1-12 were pending. Claims 1-4 and 8-9 stand rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 6,678,263 to Hammons Jr. et al. (hereinafter Hammons) in view of U.S. Patent No. 6,891,897 to Bevan et al. (hereinafter Bevan). Claims 5 and 10 stand rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 6,698,248 to Elgamal et al. (hereinafter Elgamal) and Hammons in view of admitted prior art on pages 5-6 of the specification. Claims 6-7 and 11-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form.

This Response is submitted in accordance with 37 CFR 1.116 to enter further remarks, which touch on the merits, for consideration by the Examiner such that the application be in better condition for allowance or appeal. Entry of this Response is respectfully requested.

Applicants respectfully disagree with the rejections of claims 1-5 and 8-10 and hereby request reconsideration.

The Examiner contends that the language "through a frequency selective channel," which the Applicants previously added to the preambles of claims 1, 5, 8 and 10, is an intended use. Applicants respectfully disagree.

As stated in MPEP 2111.02, "Any terminology in the preamble that limits the structure of the claimed invention must be treated as a claim limitation." (emphasis added) See, e.g., *Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.*, 868 F.2d 1251, 1257, 9 USPQ2d 1962, 1966 (Fed. Cir. 1989). See also *Catalina Mktg. Int'l v. Coolsavings.com, Inc.*, 289 F.3d at 808-09, 62 USPQ2d at 1785 ("[C]lear reliance on the preamble during prosecution to distinguish the claimed invention from the prior art transforms the preamble into a claim limitation because such reliance indicates use of the preamble to define, in part, the claimed invention." Moreover, in *Poly-America LP v. GSE Lining Tech. Inc.*, 383 F.3d 1303, 1310, 72 USPQ2d 1685, 1689 (Fed. Cir. 2004), the court stated that "a '[r]eview of the

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entirety of the '047 patent reveals that the preamble language relating to 'blown-film' does not state a purpose or an intended use of the invention, but rather discloses a ___fundamental characteristic of the claimed invention___ that is properly construed as a limitation of the claim." (emphasis added)

Frequency selectivity of the channels has led the Applicants to the design of the multi-layered structure of the invention which allows one to compensate for a lower diversity order of the space-time codes being used. In view of the foregoing, Applicants respectfully submit that the language "through a frequency selective channel," is not an intended use as the Examiner contends, but rather that it is a fundamental characteristic of the presently-claimed methods recited in claims 1, 5, 8 and 10. Applicants contend that the Examiner has improperly given the frequency selective channel language cursory consideration (to his advantage) because this language is part of the claim preambles, and therefore is easily dismissed as reciting purpose or intended use. However, in the Applicants' previous response, the Applicants relied on this preamble language, *inter alia,* to distinguish the claimed invention from Hammons. Thus, in view of *Catalina Mktg. Int'l v. Coolsavings.com, Inc.,* (cited above) Applicants have transformed the frequency selective channel language of the preambles into claim limitations. To this end, Applicants request that the Examiner properly consider the "frequency selective channel" language as a limitation of the claims.

For the benefit of the Examiner, Applicants' remarks (of the Office Action response filed April 28, 2006) setting forth important differences between Hammons and the Applicants' method of coding a data stream through a frequency selective channel are reproduced below.

Hammons discloses a full diversity space-time encoder. The encoder is illustrated in Figure 4 of Hammons and is referred to with reference number 218. As shown and described, the encoder includes an outer code 112 that provides signals to a spatial formatter 114, which itself separates signals for coding at inner code 116a, 116b and 116c. However, the Examiner admits that Hammons does not show a blockwise interleaver in Figure 4, but states that it would have been obvious for one of ordinary skill in the art to implement a block channel interleaver (e.g., Figure 1, element 20 of Hammons) after the outer code 112 to randomize burst errors in view of col. 35, lines 10-35.

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Applicants point out that Hammons discloses a method for designing space-time codes, which provide <u>full spatial diversity</u> in a multi-antenna system (col. 5, lines 46-49). In contrast to Hammons, the <u>Applicants' specific sequence of steps recited in the claims does not aim at providing full diversity</u>. Rather, the Applicants' system and method relies on a multi-layered structure which allows one to compensate for a lower diversity order of the space-time codes being used.

In further contrast to Applicants' system and method, <u>Hammons only considers flat Rayleigh fading channels</u> (either quasi-static or time-varying) (col. 2, lines 1-2; col. 2, lines 15-17; eqn (1); col. 16, line 41). That is, channels which are not frequency selective, and thus are not prone to intersymbol interference (ISI). Applicants have amended independent claims 1, 5, 8 and 10 to better clarify the foregoing distinction.

Even if assuming that one of ordinary skill in the art might have been tempted to add an interleaver to Figure 4 in Hammons in view of col. 35, l. 19-22, the addition of an interleaver would not have resulted in the recited steps or structure of the Applicants' method and system. Actually, in the present invention, the outer code is defined relative to the interleaver, and is called "outer code" because it is placed before the interleaver. Such an outer code is aimed at adding redundancy before the interleaver. It is the concatenation of the outer code and of the interleaver which allows for generation of an interleaved coded digital stream <u>exhibiting specific temporal diversity</u> (see page 16, line 6-12 and page 32, lines 28-34 of the as-filed specification).

The outer code in Hammons does not fulfill the same function as Applicants' outer code. Furthermore, since there is no interleaver in Hammons, the outer code cannot be defined relative to such an interleaver, and hence it cannot correspond to the outer code of the present invention.

It is the frequency selectivity of the channels that is considered by the Applicants to have led to the design of the multi-layered structure of the invention. Thus, the mere and direct use of the space-time encoder of Figure 4 of Hammons is inappropriate for use in such a frequency-selective context.

The design method disclosed by Hammons is based on a set of design rules in the <u>binary</u> domain (col. 5, lines 39-43). Thus, referring to Figure 4 of Hammons, the data at the input of the space-time encoder 118 are binary elements that undergo an outer binary coding

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112 as well as an inner scalar coding 116, after which the elements are parsed to various transmit antennas. After the inner coding step 116, the encoded symbols are mapped by the modulators 118a, 118b, 118c, onto constellation points from a discrete complex-valued signaling constellation for transmission across the channel (col. 7, lines 55-59).

In contrast to the Applicants' invention, Hammons discloses a method for designing in the binary domain a unique STTC coding. That is, Hammons does not disclose how to achieve a spatial multiplexing of several STTC codings according to the unique process defined by the steps of the claims of the present invention.

In view of the foregoing, one might consider that the space-time encoder of the present invention could be built by spatial multiplexing of several space-time encoders. For example, Figure 3b of the as-filed specification shows a coding system in which each inner coding element 1, m, v, could be implemented in the form of a space-time encoder, for example, as disclosed by Hammons having an outer code 112 and a spatial formatter 114 as shown in Figure 4 of Hammons.

Based upon the foregoing remarks, Applicants respectfully request reconsideration. If, in the opinion of the Examiner, a telephone conference would help clarify any issues that remain in the present application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,

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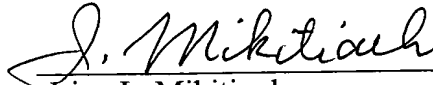(312) 569-3000 (facsimile)
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CERTIFICATE OF MAILING

I hereby certify that this RESPONSE TO FINAL OFFICE ACTION OF JULY 25, 2006 (along with any documents referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Date: <u>September 25, 2006</u>   Irina L. Mikitiouk